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ABSTRACT

Seventy-four preservice teachers in home economics and social studies were videotaped during a 10-minute microteaching session prior to and after training. A training program in nonverbal behaviors related to encouraging classroom interaction was developed. Three training approaches to this program were constructed: programatic videotape, lecture-discussion utilizing transparencies from the videotape, and practice in a microteaching setting. A Structured-Observation Inventory was also constructed to record the frequency with which selected nonverbal behaviors were manifested prior to and after training during a 10-minute microteaching. Observers trained in the use of the inventory reached an acceptable level of agreement before rating the videotapes of the microteaching. A questionnaire to assess teachers' reactions to the training and microteaching was distributed after the last microteaching. Statistical analysis of the pre-post training data involved analysis of covariance methods by sex and training approach. Questionnaire data were tabulated and reported by percentages. There were no significant differences among training approaches on the frequency with which selected variables were manifested after training, and no significant differences between males and females. Groups trained by the programatic videotape and lecture-discussion perceived their training as more helpful than did those trained by practice. (Author)

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COMPARISON OF THREE TEACHER TRAINING APPROACHES IN NONVERBAL BEHAVIORS WHICH ENCOURAGE CLASSROOM INTERACTION

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INTRODUCTION

Classroom interaction is generally seen as a desirable activity in reaching cognitive and social goals. Teachers may encourage or discourage relevant interaction. Similar to any other educational goal, its attainment can be influenced by the teacher's verbal and nonverbal behavior. As receivers of communication, pupils further communicate their responses and reactions to the messages of the teacher. Their responses and reactions constitute feedback to the teacher. Pupils, too, can be primary sources of communication in which the teacher's reactions and responses furnish feedback to the pupils. Classroom interaction is influenced by how messages are sent, received, and how feedback is expressed.

Traditionally, verbal behaviors have been perceived as the prime means of classroom communication (Hyman, 1968). There has been, however, a recent emphasis given to the relative importance of nonverbal behaviors to verbal behaviors within the classroom environment. Furthermore, the cognitive and social aspects of the classroom may be influenced by the nonverbal behaviors of pupils and teachers.

The cognitive influence of nonverbal behaviors may be seen in the work of Rosenshine (1968) and Balzer (1969). Rosenshine examined behavior predictors of effectiveness by teachers. He reported that the use of gesture and movement, which are nonverbal, significantly differentiated effectiveness of explaining by teachers. This finding was interpreted to mean that gestures and movement by the teacher may have the effect of arousing attention. In other words, verbal communication may be seen as more effective when such nonverbal behaviors as gestures and movement are employed.

Balzer studied the total classroom behaviors of biology teachers which seemed to influence learning and found that nonverbal behaviors were the most prominent form of teacher expression. Often, nonverbal behaviors acted to enhance the verbal communication and were seen as reinforcing verbal statements.

Occasionally, however, verbal and nonverbal messages conflicted with each other. Teachers verbally expressed one message but nonverbally behaved in such a way as to convey another message.

The following study by Torrance (1960) exemplifies the social influence of nonverbal behaviors. In a study designed to assess pupil reactions to teachers' verbal statements, Torrance found that when teacher verbalizations were in conflict with their nonverbal behaviors, pupils were influenced by the nonverbal. Torrance stated

> that even though teachers say the 'right words' and pupils say that they perceive their teachers as having favorable attitudes, the teachers 'real attitude' is likely to 'show through' and to affect behavior and emotional reactions.

It appears that when teachers say one thing but actually mean another, pupils are more likely to pay attention to how the teacher is behaving, rather than to what the teacher is saying. It seems likely, then, that the attaining of educational goals, either cognitive or social, may be influenced by the nonverbal behaviors of teachers and pupils.

In sum, the importance of nonverbal communication in the classroom seems apparent. Teachers and pupils both communicate attitudes, feelings, and values through their nonverbal behaviors. To date, however, investigators have primarily stressed the importance of teacher awareness to classroom nonverbal behaviors (Galloway, 1962; 1970) rather than on specifically training teachers to manifest appropriate nonverbal behaviors which tended to influence a particular educational goal. The primary purpose of this study was to compare three teacher training approaches in nonverbal behaviors which encourage classroom interaction. Considered broadly, the three training approaches were specific instances of three general ways in which teachers are trained.

PURPOSE

The primary purpose of this study was to compare three training approaches in terms of their effectiveness in producing specified goal behaviors in pre-service teachers as measured by a Structured-Observation Inventory (SOI). The sample consisted of 74 pre-service teachers in Home Economics and Social Studies. The three training approaches for this study were defined as follows:

(1) Programmatic videotape approach was an autoinstructional approach in which a videotape emphasizing examples of selected nonverbal behaviors is presented using the following basic format: prompting, scene presentation, written responses in a booklet by teachers, teachers receiving knowledge of results, and replaying the scene. This approach emphasized showing teachers the behaviors which should be manifested in classroom situations.

(2) Lecture-discussion approach was an instructional method in which an instructor presented information and showed transparencies of selected nonverbal behaviors of teachers and pupils on an overhead projector. The transparencies were taken from a programmatic videotape. A programmatic format was used in the presentation: prompting, presentation, questions by instructor, answers by subjects, and knowledge of results given by instructor. Teachers being trained were also encouraged to ask questions and discuss what had been presented. This approach emphasized telling teachers what behaviors they should manifest in the classroom.

(3) Practice in a microteaching setting was one in which the teacher was to practice teaching. No specific instructions were given other than the written instructions on "Encouraging Pupil Interaction: nonverbal behaviors in teaching" which were given to all participants in the study. It was assumed that through such a general practice experience and reading of instructions a teacher would manifest an awareness of nonverbal behaviors rather than being specifically taught nonverbal behaviors.

A Structured-Observation Inventory (SOI) was constructed to assess the demonstration of selected nonverbal behaviors during microteaching* prior to

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*Microteaching is a real teaching experience scaled down in three areas: time, number of pupils, and scope of lesson. The microteaching sessions were conducted in the Teaching Techniques Laboratory, University of Illinois, Spring, 1970.

and after training. The inventory was divided into four parts: initiating behaviors related to pupil participation, initiating behaviors related to using silence constructively, responding behaviors to interested pupils, and responding behaviors to bored pupils. The SOI is shown in Table 1.

The SOI was constructed in such a way as to specify the nonverbal behavior which should be observed and allow for a frequency tally of that behavior. Number of minutes taught was also to be recorded since experience indicated that some teachers would teach less than the required ten minutes. No time unit for recording frequency of specified behavior was established. Trained raters recorded the occurrence of a particular nonverbal behavior by keeping a frequency tally.

There are four logical categories on the SOI which are divided into two major sections. Category 1 contained two sets of teacher behaviors which appeared to be related to pupil participation in the classroom: calling on pupils who give subtle or obvious cues of wanting to speak, and using direct eye contact to monitor the class to see who wants to speak. Category 2 is related to the teacher's use of silence: allowing enough time for a called-on pupil or called-on class to respond and breaking the silence when pupils began to fidget, or show signs of distress to the silence. For ease in categorizing, these two categories were defined as "Initiating Behaviors" of the teacher in which she initiates pupil interaction.

The second major section was defined as "Responding Behaviors" by the teacher: behaviors with which she responds to either verbal or nonverbal cues of her pupils. These behaviors are seen as encouraging classroom interaction. Category 3 under this section were those behaviors made to "interested pupils" or those who are exhibiting cues associated with pupils who appear to be interested in the lesson: in some kind of motion, eyes and head directed toward the speaker, forward leaning postures. Three teacher

Table 1.--Structured Observation Inventory

Teacher_____

Nonverbal behaviors in teaching	Frequency tallies	Total
INITIATING BEHAVIORS 1. Related to pupil participation: Teacher calls on pupils who obviously or subtly indicate desire to speak. Teacher, using direct eye contact, monitors class to see who wants to speak.		
2. Use of silence: Allows enough time for called-on pupil or called-on class to respond. Breaks silence when pupils begin to fidget, etc.		
RESPONDING BEHAVIORS 3. To interested pupils: Listens without interruption when pupil speaks. When pupil speaks, nods in support, has eye contact. Moves toward pupil or pupils when pupil speaks.		
4. To bored pupils: STOPS whatever he was formerly doing. Moves toward pupil or pupils to induce interest.		

Number of minutes taught _____ Total _____

nonverbal behaviors are listed in the SOI: first, the teacher listens without (verbal) interruption when a pupil speaks. Second, the teacher nods in support and maintains eye contact while the pupils speaks, and third, the teacher moves toward a pupil or pupils when a pupil is speaking.

Category 4 is concerned with the responses made by the teacher to pupils who appear to be bored or uninterested in the lesson as seen by the nonverbal behaviors of those pupils: eyes directed away from the speaker, not following with eyes or head orientation when the verbal interaction changes, posture of pupils is "slumpy," pupil may be doodling, "lint picking," or otherwise attempting to obtain some kind of stimulating from an uninteresting environment. Two sets of teacher behaviors are listed in this category which are seen as responses to bored pupils: first, the teacher stops whatever she was formerly doing and changes the activity, and second, she moves toward a pupil or pupils to induce interest.

It should be noted that the behaviors specified in the SOI were the same as shown in the programmatic videotape, described in the lecture-discussion and shown as transparencies on an overhead projector, and verbally described in the written instructions given to all three training groups. The content for the training programs and on the SOI came from preliminary videotaping of verbal and nonverbal behaviors considered important to classroom communication by Franks and Pancrazio (1969). Selection of teaching instances showing examples of pupil and teacher nonverbal classroom communication was made on the basis of pupil validation by written report during interrupted videotaped teaching sessions relative to the extent to which the pupil was interested and felt he was being encouraged to participate in the lesson.

It should also be noted that the selection of the behaviors as described on the SOI does not represent a finite set of behaviors which are applicable to each learner in the classroom. Teachers must be sensitive to the idiosyncratic reactions of their pupils in differing social situations. In general, particular nonverbal behaviors as described above probably indicate interest level and extent to which pupils desire to interact in the classroom. However, specific behaviors may not have identical meanings for every pupil. Therefore, it is always essential that the teacher determine the accuracy of her interpretation of the message being communicated via nonverbal behaviors by utilizing additional feedback devices.

Two secondary purposes of this study were further identified: to compare males and females in terms of frequency with which selected nonverbal behaviors are manifested, and to assess teacher reactions to training and microteaching through the use of a questionnaire.

PROCEDURES

Essentially, this study utilized a pre-test/post-test design with intervening training. Three experimental training approaches were compared on measures obtained prior to and after training on 74 pre-service teachers randomly assigned to the three approaches. Teachers were randomly distributed into three training groups and were videotaped during a ten-minute microteaching session prior to and after training. A description of the training procedures is as follows:

(1) Programmatic Videotape. As an example of showing teachers what to do, a programmatic videotape was constructed. Episodes were included which demonstrated the nonverbal behaviors specified in the objectives for training program. The episodes were taken from the pool of videotaped teaching sessions developed by Franks and Pancrazio (1969). The tape was black and white and was thirty-two minutes in length. There were 13 episodes which were shown as

examples of certain teacher and pupil nonverbal behavior. There were also thirteen episodes in which a response was required in an accompanying booklet. On those response episodes, the subject was given a cue in the form of a question, shown the episode, given time to make responses in the booklet, given the correct response, then shown a replay of that episode.

As part of this training, subjects were given a set of written instructions entitled, "Encouraging Pupil Interaction: nonverbal behaviors in teaching." Content for the written instructions was similar to the material on the videotape and was taken from the videotape script.

(2) Lecture-Discussion. As an example of telling teachers what specific behaviors should be used, a lecture was constructed which utilized still pictures taken from the videotape monitor and used as transparencies for an overhead projector. The investigator conducted the class and attempted to present the same content for each class section. By using the transparencies, subjects received the same content as the programmatic videotape group. Furthermore, the investigator (who narrated the videotape) also attempted to use a programmatic format when the transparencies (26 scenes representing the 26 episodes in the videotape) were shown on an overhead projector. As part of this training, subjects were given a cue in the form of a question, shown the transparency, asked to make a response, then given the correct response. Subjects were also encouraged to discuss the next microteaching assignment: Encouraging Pupil Interaction. Many subjects asked questions regarding microteaching; and subjects were encouraged to "share their experiences." At the conclusion of the training period, the written instructions were distributed to the class. Again, the content for the written instructions paralleled that which was given in the lecture and in the programmatic videotape.

(3) Practice in a microteaching setting. As an example of having teachers practice specific behaviors, an additional practice in microteaching was arranged. As part of this training, subjects taught a ten-minute micro-lesson, and spent approximately ten to fifteen minutes in unsupervised videotape playback of their lesson. Written instructions entitled "Encouraging Pupil Interaction: nonverbal behaviors in teaching" were also distributed.

In sum, all subjects received about 40 minutes of training. All subjects, too, received a copy of "Encouraging Pupil Interaction: nonverbal behaviors in teaching."

The SOI was utilized to record the frequency with which certain nonverbal behaviors were manifested prior to and after training. Three raters trained in the use of the SOI reached a .944 coefficient of concordance (McNemar,1962) using Kendall's method for determining inter-rater agreement on a test of inter-rater reliability on 10 per cent of the videotapes.

Videotapes were randomly divided into three groups; each group contained an equal number of tapes in each of the three training approaches and also the pre-and post-tape for a given subject. The raters did not know whether they were viewing a pre-or post-training tape or in which approach the subject had been trained.

Statistical analyses of the pre-and-post training data involved the use of analysis of covariance. The pre-training measure on each of the five variables (Category 1, 2, 3, 4, and total frequency on the SOI) constituted the covariate. In this way, the variability present in the pre-training score for a particular variable was held constant in the post-training score. The level of significance selected as appropriate for this study was .05.

Separate analyses were made for the home economics and social studies subjects. For the social studies subjects, data were analyzed using sex as a variable and considered the interaction of sex and training approach. A one-way analysis of covariance was made on the data from home economics subjects. Of 74 subjects, 55 were in social studies and 19 (all females) were in home economics. Of the social studies teachers, thirty were male, and twenty-five were female.

A questionnaire was constructed to obtain reactions from participants concerning the training. Items in the questionnaire relevant to this paper were the following:

(1) Number and percentage of subjects in each training group reading the written instructions, "Encouraging Pupil Interaction: nonverbal behaviors in teaching."

(2) The extent to which the written instructions were perceived as helpful for the last (post-training) microteaching.

(3) The extent to which the training for the last microteaching was perceived as helpful to the last microteaching.

(4) The comparative usefulness of the written instructions and the training approach for the last microteaching.

At the conclusion of the post-training microteaching and videotaped playback subjects were asked to complete the questionnaire. In analyzing the questionnaire data, a frequency count, reported by percentages, was made on the item responses. Responses to the questionnaire were tabulated in terms of sex, training, subject field and total group. In contrast to the statistical analyses presented above, questionnaires from the home economics and social studies subjects were not considered totally separate since overall teacher reactions were considered adequate for the purposes of the study.

RESULTS

The results of the one-way analysis of covariance for the five variables of the home economics subjects are listed in Table 2.

Table 2.--Means, Standard Deviations, and F-Ratios for Nonverbal Behaviors of Home Economics Subjects with Regard to Training Approaches

Nonverbal behavior frequency units	Programmatic Videotape (n=9) Pre $\bar{X}$	sd	Post $\bar{X}$	sd	Adj $\bar{X}$	Lecture-Discussion (n=5) Pre $\bar{X}$	sd	Post $\bar{X}$	sd	Adj $\bar{X}$	Practice (n=5) Pre $\bar{X}$	sd	Post $\bar{X}$	sd	Adj $\bar{X}$	F-ratios of adjusted group means
Initiating behaviors related to Pupil Participation	1.00	2.00	3.00	2.06	3.01	1.20	1.30	1.20	1.64	1.15	1.00	1.00	0.80	0.83	0.81	3.446[a]
Initiating behaviors related to Pupil Influence	0.11	0.33	1.00	1.32	0.89	0.80	1.09	1.40	1.67	1.57	1.40	0.89	1.00	1.00	1.01	.359[a]
Responding behaviors related to Interested Pupils	3.66	5.54	8.00	6.32	7.08	2.20	1.92	6.59	4.15	6.92	1.00	1.22	6.00	4.06	7.33	.012[a]
Responding behaviors related to Timid Pupils	1.00	1.32	1.00	1.50	0.96	0.60	0.89	0.80	1.30	0.72	2.40	3.36	1.40	1.51	1.53	.344[a]
All behaviors for three categories	5.77	7.03	13.00	7.46	12.61	4.79	3.56	10.00	7.21	10.34	4.79	4.49	9.20	4.76	9.54	.588[a]

[a]Not significant at the .05 level ($F^2_{15} = 3.68$).

The first variable, Initiating Behaviors Related to Pupil Participation, of the home economics data in Table 2 approached significance at the .05 level, and was in favor of the group trained by the programmatic videotape. However, there were no significant differences among the three training approaches on any of the selected nonverbal behaviors of home economics teachers which encourage classroom interaction in a ten-minute microteaching situation after training. Examination of the pre-training and adjusted means for the total of the four variables would seem to indicate that learning from training took place.

In examining the data for social studies subjects, a two-way analysis of covariance was utilized considering training and sex effects for each of the five variables. The results of the two-way analyses of covariance for each of the variables is reported in Table 3.* For variables 1, 3, 4, and 5, the tests for homogeneity of regression slopes were not significant. There were no significant differences among the three training approaches in the frequency with which subjects demonstrated the particular responses being observed. Furthermore, there was no difference between males and females in the frequency with which they manifested the behaviors associated with each of those particular variables, and the interaction effect between sex and training was also not significant.

The second nonverbal variable with regard to the social studies subjects was "Initiating Behaviors Related to Using Silence." It should be pointed out that the test for homogeneity of regression for this variable with social studies subjects was significant at the .03 level with 1 and 48 degrees of freedom. Peckham (1968) has shown, however, the one-way analysis of covariance to be generally robust to violation of the assumption of homogeneity of regression slopes. No comparable study has been reported for multi-factor analysis of covariance.

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*For purposes of brevity, the cell description, number in sample, and means of social studies subjects have been omitted from this paper. These data may be obtained on request from the investigators.

Table 3.--Comparison of Social Studies Data by Sex, Training Approach and Interaction, Between Mean Square, F-Ratios, Degrees of Freedom, and Probability Levels with Regard to Selected Variables

	BETWEEN SEXES				AMONG TRAINING APPROACHES				INTERACTION OF SEX AND TRAINING			
	Between $\bar{X}$ Square	F-Ratio	df	P	Between $\bar{X}$ Square	F-Ratio	df	P	Between $\bar{X}$ Square	F-Ratio	df	P
Initiating Behaviors Related to Pupil Participation	0.043	.003	1/48	.925[a]	12.393	2.496	2/48	.093[b]	4.622	.931	2/48	.401[b]
Initiating Behaviors Related to Using Silence	2.372	2.354	1/48	.131[a]	1.020	0.836	2/48	.439[b]	.579	.474	2/48	.624[b]
Responding Behaviors Related to Interested Pupils	64.175	.925	1/48	.340[a]	77.303	1.114	2/48	.336[b]	37.267	0.537	2/48	.587[b]
Responding Behaviors Related to Bored Pupils	.0006	.0118	1/48	.913[a]	.020	.3032	2/48	.739[b]	.038	.573	2/48	.567[b]
Total Frequency for Above Categories	67.338	1.066	1/48	.306[a]	161.112	1.963	1/48	.150[b]	57.266	.699	2/48	.501[b]

[a] Not significant at .05 level ($F^1_{48} = 4.04$)

[b] Not significant at .05 level ($F^2_{48} = 3.19$)

As reported in Table 3, for Variable 2, there were no significant differences among the training approaches, or between males and females, in the frequency with which the behaviors were demonstrated after training. The interaction between sex and training approach was also found to be not significant. Examination of the pre-training and adjusted means for the total of the four variables would seem to indicate that learning from training took place.

The major findings pertinent to this paper from the questionnaire data are as follows:*

(1) Over three-fourths of the sample reported reading the written instructions. A higher percentage of subjects trained by practice (90.5) and 84.2 percent in home economics reported reading the written instructions. Slightly less than 10 percent of the total sample reported that the written instructions were not helpful, while 75.7 percent reported it was of some help (somewhat to extremely helpful). For the subjects trained by practice, however, only 61.9 percent of the 90.5 percent who reported reading the written instructions rated the instructions as only somewhat helpful. A greater percentage of subjects trained by programmatic videotape rated the written instructions as helpful to extremely helpful as compared to the other two training approaches.

(2) Only five percent of the sample rated their training as not helpful for the last microlesson. The remainder rated their training as somewhat to extremely helpful. All subjects trained by programmatic videotape rated their training as helpful (somewhat to extremely) for their last microlesson.

(3) In general, subjects reported that their training was more helpful than the written instructions, but no one reported that neither was of any help for the last microlesson.

CONCLUSIONS

First, it appeared that observers may be trained to a high degree of agreement in assessing the extent to which preservice teachers in home economics and social studies demonstrate selected nonverbal behaviors in microteaching situations. The training of observers would seem to be related

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*For purposes of brevity, the tables listing questionnaire responses are not reported but may be obtained on request from the investigators.

to the specificity of nonverbal behaviors and the limited number for which observation is to be made. That is, the more specifically the nonverbal behaviors are identified and differentiated through such techniques as portrayed on videotape, described in written materials, and orally discussed by observers, and the fewer the behaviors that observers must rate, the more likely it seemed that observers will reach a statistically acceptable level of agreement.

Second, it appeared that when training approaches are carefully controlled for time, pupil effects, and content, the three approaches seemed to be equally effective in training home economics and social studies teachers to manifest selected nonverbal behaviors related to encouraging classroom interaction. All three training approaches took approximately 40 minutes. Pupils for the microclasses were randomly assigned to lessons. Content discussed in the programmatic videotape was identical to that presented in the lecture-discussion; furthermore, a highly structured programmatic format was used to present the content for those two training approaches. Written instructions given to all three groups were similar, if not identical, to content presented through the videotape and lecture which used still pictures taken from the videotape as transparencies. A greater percentage of subjects in the group trained by the practice approach in this sample reported reading the written instructions although they seemed to rate it as less helpful to them than the group trained by the programmatic videotape.

The finding that the three approaches appear to be equally effective in training preservice teachers seemed to give tentative support to the recommendation made by Johnson (1968) that a lecture which utilized prompts, practice, and feedback may be just as effective as programmed videotape in

helping teachers to focus on selected aspects of the classroom scene. This finding also seemed to give tentative support to the equal effectiveness of approaches which combine perceptual and symbolic models in teacher education. All three approaches utilized a combination of perceptual and symbolic models: (1) the programmatic videotape approach and lecture-discussion both used scenes for modeling and subjects were also given verbal descriptions of the behaviors to be modeled, (2) the subjects in the practice approach had a greater opportunity to observe their own teaching on videotape (they had an additional ten-minute videotaped microteaching). A greater percentage of this group reported reading the written instructions which verbally described the behaviors to be modeled. Although the practice group rated it as somewhat less helpful than the actual microteaching, they might have underestimated its training value, or possibly they were able to utilize the content from the written instructions in their teaching performance.

In any case, the three training approaches may either have not differed enough to result in significant performance differences, or the nonverbal behaviors chosen for this study might have been those which can just as effectively taught by any of the three training approaches also chosen for this study.

Third, for this study at least, males and females in the area of social studies did not differ in the frequency with which they manifested selected nonverbal behaviors related to encouraging classroom interaction. While sex differences may be found in other aspects of the microteaching situation, it did not seem to be present in the area of training teachers to demonstrate nonverbal behaviors in a microteaching setting for this sample.

SUMMARY

Classroom interaction may be encouraged or discouraged by the teacher's nonverbal behavior or by the perception or lack of perception of pupil nonverbal behaviors. Programs utilizing a programmatic videotape, lecture-discussion, and practice in a microteaching setting appear to offer viable alternatives in training teachers to demonstrate nonverbal behaviors which encourage classroom interaction. Research might be directed at exploring performance results in the manifestation of nonverbal behaviors through the use of the SOI or an interaction analysis device when teachers are allowed to choose, rather than are randomly assigned to training approaches for teaching nonverbal behaviors important in the classroom. Furthermore, the relationship of selected personality characteristics to choice of preferred training approach and subsequent performance might also be examined;

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